

# FALLOUT ON THE FARM



CANADA DEPARTMENT OF AGRICULTURE

Blueprint for Survival No. 3



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# FALLOUT ON THE FARM

PREPARED BY THE CANADA DEPARTMENT OF AGRICULTURE  
AT THE REQUEST OF EMERGENCY MEASURES ORGANIZATION

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## **WHAT IS FALLOUT ?**

- **WHY SHOULD FARMERS KNOW THE DANGER OF FALLOUT?**
- **HOW WILL OUR CROPS AND LIVESTOCK BE AFFECTED BY FALLOUT?**
- **WHO WILL WARN US OF APPROACHING FALLOUT?**
- **WHERE SHALL WE FIND SHELTER FROM FALLOUT?**
- **WHEN WILL IT BE SAFE OUTSIDE AFTER FALLOUT?**
- This pamphlet tells how people, livestock and crops can be protected. The advice is based on what is so far known about the effects of fallout on the farm.





## MINISTER OF AGRICULTURE

In recent years the subject of nuclear weapons and radioactive fallout has been prominent in the news. This subject is of special interest to agriculture since our field crops and livestock would be vulnerable to fallout, which can be carried great distances in the air before settling to the earth.

The problems of fallout which could confront the Canadian farmer, as well as farmers of other countries, were recognized by scientists a number of years ago. The conclusions of many of their studies since that time have been encouraging. Nevertheless, I think we all agree that we should recognize these problems and be prepared to meet them should it ever be necessary.

It is with the above thought in mind that this booklet has been written and it is hoped it will be read with interest by Canadian farmers.

*Alvin Hamilton*  
Alvin Hamilton

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*Fallout contaminates everything it settles on.*

## **ABOUT FALLOUT**

When a nuclear bomb bursts near the ground, masses of soil and debris go up in an enormous cloud of radioactive dust. Large particles in the cloud soon come down, but fine particles floating in the air may drift hundreds of miles and settle in vast areas.

Fallout is what settles out of the cloud of deadly radioactive dust.

Fallout dust particles give off rays that may injure or kill humans and animals. Some of the particles may burn the skin; others may get into the body and cause internal damage.

Fallout is odorless and may be invisible; the rays cannot be detected except by operators with special instruments.

Fallout may settle on land and water, crops and livestock, buildings and equipment, clothing and food.

Fallout may be dangerous even in remote parts of the country.





*Radio will be the principal means of warning the public.*

Fallout reaching the ground soon after a burst is highly radioactive; what comes down more slowly may lose much of its radioactivity before it lands. Two days after an explosion the fallout has lost most of its deadly power, but where fallout is heavy it may still be dangerous.

Fallout is a mixture of many radioactive elements. Some of them lose radioactivity quickly. Some lose it slowly, and give off injurious rays for several months. One of them, radioactive strontium, gives off harmful rays for many years.

There is no known way to prevent fallout from giving off rays, or to speed up the rate at which the radiation dies away.

### **FALLOUT WARNING**

If a hydrogen bomb explodes on a clear day many people miles away will see a blinding flash and the great ball of fire that will rise in the air with the vast mushroom-shaped cloud of dust and debris containing the fallout. People who see the mushroom-shaped cloud, or any dust cloud after a nuclear explosion, should get ready to go into a shelter in case fallout comes down in their area.



A Canadian broadcasting plan involving many of the existing radio stations will be put into operation, and radio will be the principal means of warning the public of fallout. As there may be a power breakdown, every home should have a battery radio.

## FALLOUT DETECTION

The danger of fallout cannot be predicted accurately, though the probable area and time of arrival can be calculated roughly.

Radiation detection organizations, involving health services, agriculture and national defence, will be established throughout the country. With special equipment for detecting fallout they will locate radiation and measure its severity. The information gathered will be used at the time as the basis of specific instructions and guidance that will be made available to the public.



*Every home should have a battery radio, as there may be a power breakdown.*





*Determine what shelter area will protect your family.*

## **PROTECTION AGAINST FALLOUT\***

### **BEFORE A NUCLEAR ATTACK COMES**

The blast and heat of a nuclear explosion may damage or destroy farms for 15 or 20 miles around the center of the explosion. Farms further away, especially those downwind from the burst, will be endangered by fallout; but a farmer who is prepared for it will have a better chance of survival than most people.

In a nuclear war, farming will have to continue. Our survival as a nation will depend on the precautions taken during the first few days by farmers in the fallout areas. Your most important job will be to protect yourself and your family.

Determine what shelter area will protect your family best.

Radiation is absorbed by heavy materials. A person shielded by 12 inches of concrete, or by 15 inches of brick or 18 inches of earth, gets only one-twentieth as much radiation as when unprotected.

\*Refer to *Your Basement Fallout Shelter*, a free pamphlet obtainable from the local or provincial Civil Defence coordinator.





*Equip the most protected place in or near your home for a shelter.*

Equip the most protected place you can find in or near your home for a shelter. It will probably be in the basement or cellar of your house. The shelter may have to be occupied continuously for as long as 14 days, depending on the severity of fallout.

Keep a 2-week supply of safe food and drinking water in the shelter. Keep this food and water covered and renew it regularly.

Keep a handy supply of clothing, books, and other equipment for life in the shelter.

Make a list of things you will need during a stay of several days and nights in the shelter; place as many of these as possible in the shelter.

Plan an emergency supply of water for washing, install a chemical toilet and provide the means for disposing of garbage and sewage.

Be prepared to deal with injuries and fires.

Have a stock of soap for personal decontamination in case you get fallout on your skin.

Provide an alternative source of power for your well pump if it is driven by an electric motor as the supply of electric power may stop for a long time.

Store some fuel, fertilizer, feed and seed.

Further suggestions are given in the pamphlet, *"Your Basement Fallout Shelter"*.

If you have dairy cows make a small shelter in the barn. Keep sealed containers of food and water in it, and equip it with a bed.

Whoever stays in this shelter during and after fallout may safely leave it, if necessary, long enough to milk or feed the cows in the barn, before anyone can safely leave the house.

This shelter can be built of concrete, but a loose box with its walls protected to a height of 6 feet by a thick layer of earth will serve the purpose. The best location is the centre of the barn. A normally filled hayloft would give good overhead protection.

Many barns have an earth ramp under which a shelter could be built.



*You may need a shelter in the barn.*





*Have tarpaulins and sacks ready to cover your machinery.*

Make sure that your house and barn windows, doors and roofs are in good repair. Dust can get through cracks.

Clean out all rain-water gutters, pipes and drains, and keep them in good repair, so that if it rains during or after fallout some of the fallout dust will be carried away from your house and barns.

Keep your machinery, vehicles and tractors under cover, if possible, or have tarpaulins and sacks ready to cover them if you are warned that fallout is coming.

## DURING AND AFTER FALLOUT

The safest place is a basement fallout shelter or a root cellar.

If you have no basement or cellar, shelter in the most substantial building available:

If your house is massively built stay in the most protected room near the center of the ground floor.

If the house is a light structure you might be safer in the center of the barn, behind walls of sacked grain, baled hay, bags of feed or anything else that would act as a shield against radiation.

If you are informed that your farm is a few hours downwind from the fall-out, and if you have a bulldozer, you could bulldoze large amounts of earth against the barn.



*Stay in your shelter until it is safe to go out.*





*Wash your hands well after handling animals that were exposed to fallout.*

Stay in your shelter until you are informed over the radio that it is safe to go out.

In a few minutes outdoors you may get enough radiation to cause death if the fallout is very severe.

Radiation can penetrate the walls of a building to some extent, but even so you are much safer inside a building than outside.

Even when it is safe to go outdoors it may not be safe to stay out more than a few hours each day.

The further you are from fallout the less intense its rays are.

If you have to venture outside keep fallout off your skin and clothes.

Fallout dust on the body may cause serious burns.

Protect your head, neck, hands, wrists and ankles by wearing a hat, a muffler and gloves, and by tying overalls at the wrists and ankles.

If you think you may have fallout on your body, wash thoroughly.

If you think you have fallout on your clothes, brush them and change.



*Packaged, canned or bottled food is safe if stored before fallout.*

Keep a spare set of old clothes and rubber boots for outdoor use, and change when you get back to the house. Leave your outdoor clothes in the porch when you come in, to avoid taking fallout into the house and into the shelter.

Use gloves, preferably rubber ones, when working outside or when handling anything that may be contaminated, such as garden produce. Scrub your hands afterwards, paying particular attention to your nails.

Do not handle feed that may be contaminated until told by authorities that it is safe to do so. Take the precautions they recommend.

Wash your hands thoroughly after handling animals that have been exposed to fallout; their coats will have trapped the dust.



Avoid getting fallout particles inside your body, because the radiation from fallout in your body can do great damage to your internal organs and your bones.

Fallout particles can get into the body through a cut, in the air we breathe, or with food and water.

If you have a dusty job to do, wear a simple dust filter or even a handkerchief over the nose and mouth, and plug the ears with absorbent cotton. Afterwards thoroughly clean the nose and ears.

Before touching food, wash your hands well and scrub your fingernails.



*You could pile earth against buildings, if you have a bulldozer.*

# FOOD FOR YOUR FAMILY

## AFTER FALLOUT

It will be safe to use food put in sealed containers, protected storage or refrigeration before fallout.

Food produced on your farm after fallout can be used if you know it is safe to eat or know how to make it safe. For example:

Milk can be used if you are sure that your cows were in the barn before the fallout came down, and that since the fallout came down they have not left the barn and have taken only food and water on which there could have been no fallout dust.

Eggs will be safe to use if the hens have been under cover the whole time since the fallout came down and have not had contaminated food or water.

Poultry, pigs, sheep and cattle that have been exposed to fallout may be killed for your family's use, but the bones and offal should not be used for food because most of the radioactive material retained in an animal's body goes into its bones and internal organs.

Fully grown potatoes and root crops ready for harvesting will be safe to use if you wash them well to remove all soil particles before peeling them. All fallout must be removed because it is not destroyed by cooking.

Mature peas and beans will be safe to eat: only the pods will be contaminated.

Green vegetables that may be contaminated by fallout should be avoided.

It is practically impossible to remove all of the fallout from loose-hearted plants. If you have to eat green vegetables in the first few days after a nuclear attack choose plants with solid hearts such as cabbage, sprouts and lettuce. Remove several layers of the outer leaves and wash the heart thoroughly.

Plants that have been growing after fallout may be dangerous to eat.

Potatoes and root crops, peas and beans, and the leaves of cabbages may be contaminated by radioactive material taken up through the roots from the soil. Unless a test for radioactivity shows that they are not harmful, it is better not to eat plants that have been growing after fallout.

If food is so scarce that you have to eat growing plants that may be contaminated, potatoes are the least dangerous, then peas and beans, then green vegetables.



## CROPS

In most areas fallout will not affect the growth of crops, but it may make them unfit for human or animal consumption.

Crops can be contaminated in different ways by fallout. A contaminated crop may have fallout on it, or in it, or both.

The danger of contamination depends on the severity of fallout, the season, the weather, the soil and the crops affected. For example, alfalfa, clover, soybeans, and leafy vegetables absorb more radioactive strontium than cereals, potatoes, and fruits.

Crops harvested before fallout should be stored in weatherproof buildings or covered with tarpaulin or plastic sheeting as a safeguard against fallout.



*Protect crops harvested before fallout.*

## PLANTING AFTER FALLOUT

Seeding and planting may be delayed. But when it is safe to be outside it will be safe to prepare the ground for your crops, to sow seed or to plant seedlings.

After heavy fallout you may be advised to plow the topsoil under so as to bury the fallout as deep as possible before seeding or planting.

Contaminated land may have to be limed before re-seeding. Liberal use of fertilizer will help, because the better your crop the less dangerous radioactive material there will be in each pound of crop.

Do not start seeding or planting until your agricultural authorities advise you to.



*Plow the top soil under to bury fallout.*





*Threshing helps to decontaminate cereal crops.*

## **FALLOUT ON PASTURE AND FODDER CROPS**

In the growing season some of the fallout that settles on the exposed parts of crops will be absorbed by the leaves, and some of what settles on the soil will get into crops through their roots.

If fallout is light, pasture may be usable immediately. But if a radiation survey indicates severe contamination you may have to mow and remove existing growth of pasture grass, as well as alfalfa and other fodder crops. If succeeding growths are not usable you may be advised to plow deep and re-seed. The contaminated crop should be discarded in a place where livestock cannot get it, or it should be made into hay or silage and tested later to see whether it is safe for use as fodder. Even dangerously contaminated feed may be safe to use after a period of storage.

Nitrogenous fertilizer speeds up the growth of new grazing, which will be much safer than the older grass that was there when the fallout came down. The thicker the pasture the less the danger to livestock. Cattle will eat more fallout in poor pasture than in thick, quick-growing herbage.

## HARVESTING AFTER FALLOUT

If fallout comes just before harvest time it will be better to delay harvesting unless you can store the crop, as you will probably not be allowed to market any fruits, vegetables, or cereals until they have been tested for radioactivity and found to be safe.

Ripe, thin-skinned fruits may be lost; they will be too dangerous to harvest if fallout is heavy. Thick-skinned fruits that are peeled before eating may be saved if picking can be delayed and if they are properly washed before marketing.

Underground vegetables will be contaminated if they touch contaminated surface soil during harvest, but most vegetables will be marketable after thorough washing.

Cereal crops are largely decontaminated by threshing, as most of the fallout remains with the straw and the chaff.



*Livestock may sicken from fallout in their food and water.*



## **LIVESTOCK**

Fallout is dangerous to cattle, sheep, horses, pigs, poultry and other livestock as well as to human beings.

Livestock may get skin burns if fallout settles on them. They may get "radiation sickness" if exposed to fallout for long, even if not actually in contact with it. Animals left outdoors will be exposed day and night to the full effect of radiation from the fallout.

Livestock may suffer serious internal injuries if they drink fallout in their water or eat it in pasture grass or commercial feed.

Animals housed in barns and other buildings during fallout stand a better chance of surviving than those that are not sheltered. The central area of the barn is the best place.

A wall of earth 3 or 4 feet high against the buildings will add to the protection against radiation that they give your animals. Bags of seed and feed, soaked bales of hay or any other materials piled against the walls will also help to protect livestock in the buildings.

Work out in advance whether you have shelter for all your summer livestock; try housing them some day to see how long it takes.

Keep plenty of silage and hay so that you can avoid or delay putting cattle out on contaminated pastures.

If you receive ample warning that fallout is coming, you can take certain precautions to protect your livestock. But once fallout occurs do not attempt to protect them unless the authorities tell you that it is safe to do so.

### **IF FALLOUT IS EXPECTED**

Move livestock indoors as soon as possible.

Get your cows under cover first.

Milk them before fallout occurs, if you can; you may not be able to milk them again for a day or two.

Put cows and calves together, if possible, so that the calves can ease full udders.

Reduce their supply of water and their rations of concentrated feed.

Bring other livestock into buildings if possible.

If you do not have adequate facilities to house them, put them near farm buildings, in a yard, or in a small tree-sheltered field.

Give them only enough feed and water to keep them alive: you may need your clean feed for dairy cattle.



*Sheltered animals have a better chance to survive.*

Bring in as much clean fodder as you can. It may be a long time before you can obtain uncontaminated feed.

Put tarpaulin or plastic sheeting over fodder in open silos or stacks.

If you have suitable storage space, get an ample reserve of concentrated feed.

Store as much water as possible, especially if the water comes from ponds or streams or through water mains. It must be stored in or near the buildings.

Cover wells and rain barrels.

Turn the spouts so that rain will not wash fallout from the roof into the clean water in the barrels.

Get fencing ready to confine cattle to a small area of grazing if necessary.





*Move livestock indoors as soon as possible.*

## **AFTER FALLOUT**

When it is safe to go out, your first job in the few hours that you may stay out each day will be to see to your livestock.

Keep your cows under cover, preferably until you are informed that it is safe for them to go out to graze.

Keep animals off contaminated feed and water as long as possible.

Fallout that settles on hay, silage or a stack of feed bags contaminates only the outer parts. Remove the outer layers or bags, and use the unaffected feed inside.

Water in a pond or an open tank will be safer if you stir in clay and let it settle.

Keep animals alive on small amounts of contaminated feed and water rather than let them die of hunger and thirst.

You may have to give cows contaminated feed if you have no other feed.

A dairy cow on contaminated feed or grazing contaminated pasture is exposed to internal radiation from the fallout on what she has eaten. Some of that fallout will be excreted; but some will be retained in the cow's body and some will go into her milk. It will be dangerous for human beings to drink this milk, even if there is only a small amount of radioactive material in it.

Even where fallout is too light to cause any direct harm to humans, cows on pasture may eat enough radioactive material to make their milk unsafe to drink.

If a shortage of feedstuffs forces you to put your cows out before it is safe for them to graze, give them the best pasture and put them on as small an area as possible, so as to reduce the amount of fallout getting inside them.

Authorities measuring fallout in affected areas will notify you if forage is considered harmful and will warn you when milk is unsafe.



*Cover open silos or stacks of fodder.*



Use water from a covered well if possible.

Water from a covered well, tank or cistern or from a freely running spring will probably be safe.

A fast-flowing stream is likely to be safe.

Pond water is less safe but, if necessary, it can be used a few days after fallout has occurred.

Do not risk contaminating the clean water in a tank or cistern by adding to it from any source except a properly protected well or spring.

## **CONTAMINATED LIVESTOCK PRODUCTS**

Contaminated livestock products may become safe for consumption if they can be stored long enough to allow the radioactivity to subside. Do not destroy them unless spoilage makes them inedible.

Contaminated milk, or milk about which you are doubtful, can be made into cheese or butter if you have facilities for doing so. The product will have to be tested for radioactivity later on.



*Store as much water as possible.*



*Have fencing ready to confine cattle in a small grazing area.*

Contaminated milk, whether whole or separated, can be fed to pigs and steers. Its radioactivity is unlikely to do them much harm before they are ready for the butcher.

Milk about which you are doubtful may be kept for a day or two until it can be tested.

Once cows are back on clean feed the amount of radioactive material in their milk will gradually decrease. After a few weeks their milk should be fit for human consumption, but it is impossible to say exactly how long it will be before you can safely use milk from cows that have eaten contaminated feed. Such milk should not be used for human consumption without the approval of agricultural and health authorities.

Eggs from hens using contaminated feed may be eaten if urgently needed, as the risk of dangerous contamination is very small. Radioactive materials may show up in the eggs, but most of the radioactive strontium will collect in the shells; very little will collect in the yolk and white.

You will receive precise instructions from your agricultural authorities as to what animal food products are safe to market.



## DECONTAMINATION

If possible, clip animals that have fallout on their coats or hose them down. You can wash much of the radioactivity off livestock that have been contaminated by fallout.

Before you hose down animals or clean stables, barns and other farm buildings, get the advice of agricultural authorities. They will check radiation hazards and tell you when it is safe to do these things.

## RADIATION SICKNESS

Radiation sickness is caused by radiation received externally or by radiation received internally through swallowing fallout. Animals that receive enough radiation to cause radiation sickness show irritability, diarrhea, loss of appetite, and apathy. These symptoms may appear within a few days after fallout or may be delayed a week or two, according to the severity of the fallout and the amount swallowed.



*Water from a covered well should be safe.*

Radiation sickness is not infectious but it reduces resistance to other infection. If your livestock receive a heavy dose of radiation they may sicken and die within a few weeks, and you may have to burn them. Even if they do not die, they will not be thrifty again, and better use could be made of the feed they consume.

The flesh of animals with radiation sickness will be edible if they are killed before they become very sick. But it would be better not to slaughter them until you are officially advised to, as it would be easier to preserve meat on the hoof than on the hook in the early days of a nuclear war. By keeping animals alive you will help the authorities to organize fair distribution of meat.

In some districts losses of livestock may be serious, as there is no treatment for radiation sickness in animals, and the level of radioactivity may make it likely that a high proportion of the cattle will suffer from it. As soon as practicable, and possibly before any signs of radiation sickness become apparent, arrangements will be made for the slaughter of cattle and suitable disposal of the bones and offal. You will be given full instructions if such arrangements are being made in your area.



*Try to clip or hose down animals that have fallout on their coats.*





*You may have to bury animals that die of radiation sickness.*

## **IF A WAR THREATENS**

Make sure that you are familiar with the contents of this and other survival pamphlets.

The Government will supply you with more detailed advice about the problems you may have to face. Do not hesitate to get in touch with your government agricultural representatives, veterinarians, or other emergency personnel.

## **IF AN ATTACK COMES WITHOUT WARNING**

Civil Defence authorities will depend on farmers to take precautionary measures like those outlined in this pamphlet.

Measures to deal with the large numbers of livestock that may sicken or die as a result of radiation, plans to control the movement of farm produce that may be contaminated, and other plans that will affect the farmer, are being worked out.



## **IN THE WINTER**

A nuclear attack may come during the winter, so prepare facilities for heating the shelter and have a special reserve of fuel. Remember that in winter it may be difficult to take certain precautions; for example, water must be stored where it cannot freeze, and it may be impossible to bulldoze frozen earth.

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THIS PAMPHLET is intended to help you through the first few difficult days, and the week or two just after fallout has come down. It does not deal with the longer-term problems such as how best to get a badly contaminated farm back into production. Problems like this will not be the same for every farm; they can best be tackled with advice on the spot.



Additional copies of this pamphlet may be obtained from:

Information Division

CANADA DEPARTMENT OF AGRICULTURE

Ottawa, Ontario

If you would like more information about protection against fallout, write for these pamphlets:

Blueprint for Survival No. 1 — *Your Basement Fallout Shelter*. Available from the Emergency Measures Organization, Privy Council Office, East Block, Ottawa, Ontario.

Blueprint for Survival No. 2 — *Basement Fallout Shelter, a guide for use in the design of new homes*. Available from Central Mortgage and Housing Corporation, Ottawa, Ontario.

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## **DURING A NUCLEAR ATTACK**

YOU AND YOUR FAMILY SHOULD FIRST ATTEND TO YOUR OWN SAFETY.

You may have to ignore your livestock and crops.

### **BEFORE FALLOUT COMES**

TAKE SOME FARM AND GARDEN PRODUCE INTO THE HOUSE.

If you have time, take enough to last a week or two.

FILL CONTAINERS WITH WATER FOR DRINKING, COOKING AND WASHING.

Try to have a 2-week supply indoors. Cover the containers.

### **DURING FALLOUT**

STAY IN THE BEST SHELTER AVAILABLE.

The safest place in a house is the fallout shelter or root cellar.

Make for the nearest building if you are caught in descending fallout.

LISTEN TO A *BATTERY-OPERATED* RADIO FOR ANNOUNCEMENTS.

KEEP INDOORS UNTIL THE DANGER IS OVER.

The authorities will inform you when it is safe to go out and how long it is safe to stay out. Do not stay out longer than they recommend, and do not touch anything that may be contaminated.

WHEN IN DOUBT TAKE SHELTER.

### **AFTER EXPOSURE TO FALLOUT**

WASH YOUR HANDS AND FACE; CHANGE YOUR CLOTHING.

Do this as soon as possible after exposure to heavy fallout.

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MY CIVIL DEFENCE COORDINATOR IS \_\_\_\_\_

PHONE \_\_\_\_\_